

NOTES ON SOME SKELETONS AND SKULLS OF PORPOISES  
OF THE GENUS *PRODELPHINUS*, COLLECTED BY DR. W.  
L. ABBOTT IN THE INDIAN OCEAN.

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DURING his recent cruise among the islands north of Madagascar, Dr. Abbott collected three complete skeletons and two skulls of porpoises. These, with notes and measurements, he has very kindly presented to the National Museum. The notes include a description of the coloration of each specimen captured, and thus it is possible to correlate the external characters with those of the skeleton. This is a most important matter, and especially so in this instance, as the specimens all belong to the genus *Prodelphinus*, than which there is no more difficult group among the Delphinidæ.

It is with considerable diffidence that I attempt to identify Dr. Abbott's specimens with any of the described species of *Prodelphinus*. The practice of establishing species on single skulls was formerly followed in connection with this genus as elsewhere in the Delphinidæ. But it has been pointed out, especially by Sir William Flower, that in a series of skulls of *Prodelphinus*, while those at the extremes may show differences which would entitle them to be regarded as specifically distinct, these differences blend together in the middle of the series. Hence, in considering the identity of any particular skull, it is often doubtful to which one of several nominal species it should be referred.

Much new light has been thrown on the relationships of the species of *Prodelphinus* by Dr. Lütken in his most valuable work upon this and other genera of Delphinidæ,\* published in 1889. Having in his possession an excellent collection of skeletons of various species of *Prodelphinus*, accompanied by color-notes, measurements, etc., he was able to furnish much fuller information than any previous writer. For several species he has given the number of vertebræ, the position in the ver-

\* Bidrag til Kundskab om de tre pelagiske Tandhval-Slaegter *Steno*, *Delphinus* og *Prodelphinus*. Vidensk. Selsk. Skr., 6. Raekke, naturvid. og math. Afd., V, 1, 1889. At the time a copy of this paper reached me, my own work on the Delphinidæ (A Review of the Family Delphinidæ. Bulletin of the U. S. National Museum, No. 36, 1889) was passing through the press, and I was unable, therefore, to make as good use of it as I should have desired to do.

tebral column in which the various processes and foramina originate and disappear, the number of phalanges, the absolute and relative dimensions of the skull, and many other important details. In treating of Dr. Abbott's specimens I shall follow the method originated by Dr. Lütken, thereby supplying the means for further comparisons.

In spite of certain differences in coloration, etc., I regard all of Dr. Abbott's specimens as belonging to the same species. They seem to me identical with the specimens (Nos. 8 and 3) which Dr. Lütken identified (rightly I believe) with Gray's species *attenuatus*. The question of their relationship to other species I shall pass over for the present, and shall proceed to describe them in detail. The material is as follows:

- a. Complete skeleton of a male, 6 feet 2 inches long, from off the Amirantes Islands; obtained February 12, 1893. No. 36049.
- b. Skull of a female, 7 feet long, from off the Amirantes Islands; obtained February 15, 1893. No. 36050.
- c. Skull of a female, 6 feet 1 inch long, from off Alphonse Island. No. 36131.
- d. Complete skeleton of a female, 6 feet 2 inches long, from off Providence Island; obtained August 12, 1892. No. 36051.
- e. Complete skeleton of a male, 5 feet 6½ inches long, from off Johanna Island; obtained January 15, 1893. No. 36048.

The external coloration is given by Dr. Abbott as follows:

No. 36049, ♂, Amirantes Islands.—Above, blackish; below, light gray or ashy, with a sharply-defined line of division between the two colors. Belly speckled with black spots of the size of barley grains. "Black portion saddle-shaped, narrowing in front, passing to the base of the rostrum, and 4 inches above the eye. A darkish line passes through the eye. Rostrum black above, gray beneath, with black spots the size of barley grains."

No. 36050, female, Amirantes Islands.—Above, dark gray, speckled with white; beneath, light gray. (Whether the colors are sharply separated is not specified in this instance.)

No. 36131, female, Alphonse Island.—Color dark gray or ashy; above, nearly black; beneath, light, with a sharply-defined line of demarkation. Belly not speckled.

No. 36051, female, Providence Island.—Dark gray or ashy; darkest on the back, speckled with white below.

No. 36048, male, Johanna Island.—Back, dark ashy; beneath, pale ashy, speckled with irregularly-shaped dark ashy spots the size of maize grains. Line between dark and light parts sharply defined, especially on the head, where it passes 3 inches above the eye to the base of the rostrum.

It will be observed that the ground-color in all these specimens is quite uniform, and that the chief difference is in the spotting. It is also worthy of remark that the spots of the females are white, while those of the males are black or dark gray. This may be accidental, but the idea that the difference in the color of the spots is a sexual character derives some support from the fact that the type of Gray's *D. punctatus* (considered by me as identical with *P. attenuatus*), which was a female, had white spots. Dr. Lütken\* does not refer to the presence of spots in

\*L. c., p. 45.

this species. The color of his No. 8, however, was "very dark above and ashy gray below," in which it agrees, so far as the ground-color is concerned, with Dr. Abbott's specimens.

Bringing together in tabular form the measurements of the exterior given by Dr. Abbott and those of Dr. Lütken's No. 8, we have:

Table measurements.

Catalogue number.	Sex.	Total length.	Tip of rostrum to base of dorsal.	Height of dorsal.	Width of flukes.	Length of pectoral.	Girth immediately behind pectorals.	Girth at anterior base of dorsal.	Girth at posterior base of dorsal.
		<i>Ft. In.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
36050.....	♂	7 0							
36049.....	♂	6 2	33	5½	17	10	31½		
36051.....	♂	6 2		6½					
36031.....	♂	6 1		6½				38	31½
36048.....	♂	5 6½		6	15	9			
Lütken's No. 8.....	♀	5 7½	31½					35	

The number of teeth in the different skulls is as follows: No. 36059, female,  $\frac{38-38}{36-38}$ ; No. 36049, male,  $\frac{38-38}{38-37}$ ; No. 36051, female,  $\frac{39-39}{39-39}$ ; No. 36031, female,  $\frac{44-43}{40-41}$ ; No. 36048, male,  $\frac{41-39}{39-40}$ . The total number, therefore, varies from 150 to 168. The number in Dr. Lütken's two specimens was 147 and 163, respectively.

In the three skeletons collected by Dr. Abbott and the two of Dr. Lütken, the number and the divisions of the vertebræ are as follows:

No. 36049, ♂.—C. 7; D. 16; L. 20; Ca. 36-79.

No. 36051, ♀.—C. 7; D. 16; L. 20; Ca. 35-78.

No. 36048, ♂.—C. 7; D. 16; L. 20; Ca. 36-79.

Dr. Lütken's:

No. 8, ♀.—C. 7; D. 15; L. 21; Ca. 36-79.

No. 3, (?).—C. 7; D. 15; L. 21; Ca. 38-81.

The amount of variation here shown is very slight for members of this family. In the first and third of Dr. Abbott's specimens, the last pair of ribs is rudimentary, while in the second (No. 36051) there are two rudimentary ribs on the left side and one on the right. Each of Dr. Lütken's specimens possessed a single pair.

The characters connected with to the relative position of the processes and foramina of the vertebræ next claim our attention, and here again the amount of variation is small:

Characters.	36049, ♂.	36051, ♀.	36048, ♂.	Lütken's 8, ♀.	Lütken's 3.
First vertical arterial foramen is in vertebra number.....	55	56	57	58	57 or 58
Last distinct transverse process is on vertebra number.....	59	60	60	62	61
Last distinct neural spine is on vertebra number.....	66	67	66	67	67 or 68
Vertebræ without metapophyses.....	31st to 46th	33d to 42d	33d to 45th	33d to 44th	29th to 44th

The last relationship, that of the number and portion of the metapophyses is, perhaps, of little importance, as these processes die away very gradually and different observers might disagree as to the real number.

In the number of phalanges, Dr. Lütken's two specimens show a considerable difference, while those of Dr. Abbott agree well among themselves. The formulæ (the metacarpals being excluded) are as follows:\*

Digits.	36049, ♂.	36051, ♀.	36048, ♂.	Lütken's No. 8, ♀.	Lütken's No. 3.
	<i>Phalanges.</i>	<i>Phalanges.</i>	<i>Phalanges.</i>	<i>Phalanges.</i>	<i>Phalanges.</i>
First digit .....	1	1	1	2	0
Second digit .....	8	8	8	8 (9)	7
Third digit .....	5	5	5	6	5
Fourth digit .....	2	2	2	2	2
Fifth digit .....	0	1	1	1	1

The five skulls agree well in proportions, the rostrum being 60 to 61 per cent. of the total length in all. The breadth of the rostrum at its base, compared with its length, varies from 37.5 per cent. in the largest skull to 40.5 per cent. in the smallest. Other proportions may be learned from the following table of measurements:

Measurement.	36050, ♀, Amirantes Is- lands.	36049, ♂, Amirantes Is- lands.	36051, ♀, Provid- ence Is- land.	36031, ♀, Alphonse Island.	36048, ♂, Johanna Island.	Lütken's No. 8, ♀.	Lütken's No. 3.	Type of <i>P. attenu- atus</i> , Brit. Mus. 347b.
Total length from tip of rostrum to surface of occip- ital condyles. ....	<i>mm.</i> 415	<i>mm.</i> 407	<i>mm.</i> 403	<i>mm.</i> 397	<i>mm.</i> 379	<i>mm.</i> 400	<i>mm.</i> 400	<i>mm.</i> 383
Length of rostrum.	253	251	244	241	222	245	243	229
Breadth of rostrum at its base .....	95	95	91	96	90	90	84	87
Length of temporal fossa .....	60	65	64	65	63	.....	.....	65
Vertical height of temporal fossa...	47	56	53	56	54	.....	.....	50

The species *P. attenuatus*, (Gray), with which Dr. Abbott's specimens are here identified, is one of a group of nominal species, thirteen or more in number, which I regarded in my Revision of the Delphinidæ † as probably reducible to three. With *P. attenuatus* I associated *Delphinus pseudodelphis*, Wiegmann; ‡ *Steno capensis*, Gray; § and *Clymene punctata*, Gray. || The first of these names, *D. pseudodelphis*, appeared originally as the legend of a plate in Schreber's Säugethiere, representing a skull of the same general characteristics as those described herein. No description of the type-skull has been published, so far as I am

\* By referring to Dr. Lütken's illustrations I find that he apparently includes the metacarpals with the phalanges proper. In quoting his formulæ, therefore, I have subtracted one from the number given for each digit.

† Bull. U. S. Nat. Mus., No. 36, 1889, p. 67.

‡ Schreber's Säugethiere, pl. 358.

§ Proc. Zool. Soc., London, 1865, p. 522

|| Loc. cit., p. 738.

aware, though Wagner, on the authority of Troschel\* gives the number of teeth as 40 above and 37 below. The name will, therefore, remain as a *nomen nudum*, except for those who regard a name attached to a plate as having a status in systematic nomenclature. The plate must have appeared before 1841, and had it been accompanied by a description, the name would have priority over Gray's *attenuatus*.†

The skull upon which Gray based his *Steno capensis* has been considered by Sir William Flower and myself as specifically identical with his *attenuatus*, and as the description was not published until 1865, the former name, of course, becomes a synonym of the latter.

Gray's *Clymene punctata*,‡ the type-skull of which I examined in the Liverpool public museum, appears to me to be also a synonym of *P. attenuatus*. I did not have an opportunity to count the vertebræ, however, or to note the relative positions of the foramina, and it is possible that differences will be found here which are not correlated in the skull. It is also to be noted that in the figure of the exterior published by Gray,§ a band of light color passes obliquely across the back near the base of the caudal fins. No such color-marking is mentioned in Dr. Abbott's notes or elsewhere, and it may constitute a distinction of important, though I am disposed to regard it as an individual variation.||

\* Schreber's Säugethiere, 7<sup>er</sup> Th., 1846, p. 332.

† Wagner states (Schreber's Säugethiere, 7<sup>er</sup> Th., 1846, preface) that Weigmann died before completing his work on the cetacea for the *Säugethiere*. The plate must have been issued as early as 1841, however, as Schlegel refers to it in his *Abhandlungen aus dem Gebiete der Zoologie*, of that date, and assigns to the species a skull in the Leyden collection.

‡ Described in 1865.

§ Catalogue of Seals and Whales, 1866, p. 398, fig. 101.

|| NOTE.—In my Revision of the Delphinidæ, p. 61, I make the statement that the genus *Prodelphinus* is distinguished from *Tursiops* by its *less* numerous teeth. The opposite, of course, is intended.